

REMARKS

Reconsideration of the application in view of the following remarks is respectfully requested.

I. Status of the Claims

Claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-137, 139-151, and 158-164 are pending in this application. Claims 152-157 were withdrawn during prior prosecution. In the Office Action mailed on November 6, 2009, claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-135, 137-151 and 158-164 were rejected and claim 136 was objected to as being dependent on a rejected base claim.

Claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-137, 139-151 and 158-164 remain under prosecution.

II. Rejections Under 35 U.S.C. §112, First Paragraph

Claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-137, and 139-151 are rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. The Examiner states that there is no support for “selective spatial isolation of said means for plasma etching said specimen and said specimen from said plasma generator, said means for removing material and said means for coating said specimen when said means for plasma etching said specimen is operational.” Specifically, the Examiner inquires what element isolates the means for etching from each of the devices. See Office Action page 2.

Applicant respectfully requests reconsideration and withdrawal of the rejection because the Specification discloses several examples of the isolation of the etching means from each of

the other devices. Figure 1 illustrates one embodiment of the invention, showing a device in which specimens may be plasma cleaned, etched or coated alone or in combination under a continuous vacuum state. The specification describes Figure 1 as follows:

Plasma cleaning, etching and coating apparatus 10 also includes etching and coating chamber 20 made of, for example, stainless steel or aluminum, in which a specimen may be etched, coated, or both. Plasma chamber 15 and etching and coating chamber 20 are connected by vacuum valve 25, which may be manually or automatically actuated. Preferably, vacuum valve 25 is provided with interlocking capability to prevent inadvertent opening of vacuum valve 25 if plasma chamber 15 and etching and coating chamber 20 are at unequal pressures, such as where one is at atmospheric pressure while the other is under vacuum conditions.

See Specification, page 17, lines 16-22. Thus, Figure 1 clearly illustrates an apparatus for preparing a specimen for microscopy in which an etching chamber is isolated from other devices. The device is provided with a vacuum valve to prevent the mixture of the contents of the plasma chamber 15 and etching and coating chamber 20.

Figure 1 also shows a transfer rod 30 which accommodates one or more sub-mounted specimens 3. Transfer rod 30 moves back and forth between *two separate* chambers-plasma chamber 15 and etching and coating chamber 30-through vacuum valve 25. See Specification page 18, line 21 to page 19, line 1. Transfer rod 30 is described as functioning as follows:

Etching and coating chamber 20 is at or near its base pressure of, for example, 10^{-7} torr. Vacuum valve 25 is opened and transfer rod 30 is pushed into etching and coating chamber 20 until the gripper 32 is positioned in etching and coating chamber 20 and the specimen stub or stubs 7 engage specimen stage 35. Once the specimen stub 7 engages specimen stage 35, the gripper 32 on the end of transfer rod 30 releases the stub 7 and *is retracted with transfer rod 30 through vacuum valve 25 and vacuum valve 25 is closed.*

Emphasis added. See Specification page 29, lines 11-17.

The specification also describes moveable shutters or baffles positioned in front of viewing window 200 and magnetron sputtering head 105 to “further protect from

deposition of foreign material when not in use.” These features are further described as follows:

For example, the shutter over the magnetron sputtering head 105 prevents deposition of etching products from the ion beam etching onto the magnetron target surface; these products could otherwise be deposited onto the specimen during subsequent magnetron sputter coating. Similarly, the shutter over the viewing window 200 prevents deposition of etching and/or coating products on the viewing window; these products would otherwise interfere with the optical clarity of the window 200.

See Specification page 28, lines 11-18.

In addition, Figure 6 illustrates an apparatus including two vacuum vessels 610 and 620. The port for specimen introduction and removal, the plasma generator and RIE electrode are located in vessel 610, while the ion gun and sputter target are located in vessel 620. The two vessels are joined by a shared valve 630, which serves to *isolate* and/or connect the two vessels. See Specification page 34, lines 5-15. The specification also describes an additional embodiment where the valve 630 is replaced by a moveable baffle that, when closed, blocks the line-of-sight travel between vessels 610 and 620.

Applicant respectfully asserts that specification provides sufficient description of the portion of the claimed apparatus responsible for isolating the means for etching from the other devices. The claims therefore satisfy the written description requirement of 35 U.S.C. § 112, first paragraph. Applicant respectfully requests that the Examiner reconsider and withdraw the rejection in view of at least the foregoing comments.

Claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-137 and 139-151 are rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. The Examiner states that the specification does not disclose plasma

cleaning and coating of the specimen in the same chamber. The Examiner further states that Fig. 1 illustrates that these two processes are performed in two chambers. See Office Action page 3.

Applicant respectfully requests reconsideration and withdrawal of the rejection because the Specification discloses several examples of the plasma cleaning and specimen coating processes occurring in the same chamber. The Examiner's attention is directed to Figure 5, which illustrates this single vacuum chamber. Figure 5 is described in the specification at page 20, lines 15 - 21 and page 21, lines 17 - 20:

In another embodiment of the present invention, shown schematically in Figure 5, the apparatus includes one vacuum vessel 510 having a vacuum pump 511 generally similar to vacuum pump 410 of Figure 4, a port for inserting and extracting specimens 1, a specimen stage 35 for holding an manipulating specimens 1, ***a plasma generator 520 for plasma cleaning***, an ion gun 130 for ion beam etching, a moveable electrode 530 for performing RIE, and ***a sputter target 540 working in combination with ion gun 130 for depositing conductive coatings by an ion beam sputtering process***.

The apparatus shown in Figure 5 thus enables ion milling, plasma etching, plasma cleaning and/or coating steps to be performed in any order, any number of times, and according to various operating parameters while specimen 1 is under continuous vacuum conditions (emphasis added).

In addition, the Specification at page 24, line 33 to page 27, line 17 and Figures 8, 10 and 11 describes a single chamber device. With reference to Figures 8 and 11, the device contains a plasma generator housed within shield 897 for plasma cleaning the specimen within the vacuum chamber. A sputtering process to coat the specimen is performed in the same chamber using an ion source 910 in combination with a sputter target ("Apparatus 800 is also adapted to deposit conductive coatings on specimen 835."). See Specification page 26, lines 27-28 and Figure 10. A moveable shutter 905 is provided in the vacuum chamber 805 that may move to cover the aperture 900 when plasma cleaning is not in process. This is done to protect the components of the plasma generator during other specimen preparation procedures. The specification therefore

describes a single chamber device which utilizes moveable shutters or baffles to separate or protect the different cleaning and coating devices. Although these mechanisms are fully separated from each other, they are still located within the same vacuum chamber.

Applicant respectfully asserts that specification provides sufficient description of a single chamber system. The claims therefore satisfy the written description requirement of 35 U.S.C. § 112, first paragraph. Withdrawal of the rejection is respectfully requested.

III. Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1, 3-7, 21, 24, 25, 58-64, 68, 69, 73, 74, 121, 124, 129, 139, 140, 141, 142, 143, 149 and 151 under 35 U.S.C. § 103(a) as being obvious over Siebert, United States Patent No. 4,858,556 in view of Moslehi, United States Patent No. 6,051,113, Mahler, United States Patent No. 4,595,483 and Miyoshi, United States Patent No. 6,325,857. See Office Action pages 4-10.

The Examiner rejected claims 16 and 65 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler, Miyoshi and further in view of Ameen, et al., United States Patent No. 6,143,128. See Office Action page 9.

The Examiner rejected claims 17-20 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler, Miyoshi and Ameen, and further in view of Chang, et al., United States Patent No. 6,434,814. See Office Action page 10.

The Examiner rejected claims 26-29, 75, 147, 148 and 150 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler, Miyoshi and further in view of Mitro, et al., United States Patent No. 5,922,179. See Office Action page 11.

The Examiner rejected claim 30 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Miyoshi and further in view of Kobayashi, et al., United States Patent No. 5,340,460. See Office Action page 12.

The Examiner rejected claim 31 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Miyoshi and further in view of Holland, United States Patent No. 5,311,725. See Office Action pages 12-13.

The Examiner rejected claim 118 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Nomura and further in view of Nomura, et al., United States Patent No. 6,641,703. See Office Action page 13.

The Examiner rejected claims 120 and 125-128 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Miyoshi and further in view of Chang, et al., United States Patent No. 6,434,814. See Office Action pages 13-14.

The Examiner rejected claims 130-135 and 137 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Miyoshi and further in view of Hurwitt, United States Patent No. 3,756,939. See Office Action pages 14-15.

The Examiner rejected claims 144-146 under 35 U.S.C. § 103(a) as being obvious over Siebert in view of Moslehi, Mahler and Miyoshi and further in view of Baldwin, et al., United States Patent No. 6,419,802. See Office Action pages 15-16.

The Examiner rejected claims 158-160 under 35 U.S.C. § 103(a) as being obvious over Moslehi in view of Mitro and Baldwin. See Office Action pages 16-17

The Examiner rejected claims 161-164 under 35 U.S.C. § 103(a) as being obvious over Moslehi in view of Mitro and Baldwin. See Office Action pages 18-19.

The claimed invention requires that the plasma etching functionality be *isolated* from the other component functionalities of the device *when said means for plasma etching said specimen is operational*. As explained previously, this spatial limitation requires that the highly corrosive etching hardware be separated physically from the other functional devices. Applicant continues to contend that this is not taught nor suggested in the prior art. The Siebert reference does identify a shutter which rotates to expose the specimen to the appropriate operative hardware, and which is stated to provide additional substrate protection. However, no further disclosure is made and Fig. 7 merely identifies it as a standalone, line of sight shield between the various operative hardware and the specimen. Moreover, the testing or detection devices of the Siebert reference are still contained within the chamber with the specimen. The shutter is not shown to spatially separate the specimen and plasma etching mechanism from the other operative components. The Examiner relies on a single, nonspecific reference to other devices, “the sources 18 may be any of a number of different types of sources. . .” (col. 12, lines 24-25). This is the Examiner’s basis for linking *three* additional references to arguably find all of the elements of the claimed invention.

KSR International Co. v. Teleflex Inc., 550 U.S. 398, 127 S.Ct. 1727, 167 L.Ed.2d 705 (2007) disposes of the heretofore enunciated standard requiring a teaching, suggestion or motivation to combine references, in order to avoid improper hindsight reconstruction. *Id.* at 1742. The TSM standard has not been completely disavowed, however. A flexible TSM standard has been approved by the United States Court of Appeals for the Federal Circuit, following the KSR ruling.

[T]he Supreme Court advised that ‘common sense’ would extend the use of customary knowledge in the obviousness equation: ‘A person of ordinary skill is also a person of ordinary creativity, not an automaton.’ *Id.* Thus, the Supreme Court set aside any ‘rigid’ application of the TSM test and ensured use of

customary knowledge as an ingredient in that equation. The Supreme Court observed that this court had also ‘elaborated a broader conception of the TSM test than was applied in [KSR]. *Id.* at 1743. Specifically the Court referred to *DyStar Textilfarben GmbH & Co. v. C.H. Patrick Co.*, wherein this court noted: ‘[o]ur suggestion test is in actuality quite flexible and not only permits, but requires, consideration of common knowledge and common sense.’ 464 F.3d 1356, 1367 (Fed.Cir.2006) (emphasis original). The Court suggested that this formulation would be more consistent with the Supreme Court’s restatement of the TSM test. *KSR Int’l Co.*, 127 S.Ct. at 1739. In any event, as the Supreme Court suggests, a flexible approach to the TSM test prevents hindsight and focuses on evidence before the time of invention, see, e.g., *In re Rouffet*, 149 F.3d 1350, 1357 (Fed.Cir.1998), without unduly constraining the breadth of knowledge available to one of ordinary skill in the art during the obviousness analysis.

In re Translogic Technology, Inc., 504 F.3d 1249, 1260 (Fed.Cir. 2007). Pre-TSM courts utilize standards which are entirely consistent with this formulation. *In re Fine*, 837 F.2d 1071, 1073-75 (Fed.Cir. 1988), states:

To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of all the evidence, the decisionmaker must then determine whether ... the claimed invention as a whole would have been obvious at that time to that person. The answer to that question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts . . . It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references . . . It is essential that ‘the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made . . . to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art.’ One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention (citations omitted).

In this case, as in *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358 (Fed.Cir. 2008), the references amply support a finding of nonobviousness. “The challenges of this inventive process would have prevented one of ordinary skill in this art from traversing the multiple obstacles to easily produce the invention in light of the evidence available at the time of invention.” *Id.* at 1365. Siebert merely discloses the potential use of other sources.

It contains no further disclosure, nor any separation therebetween. Figure 2 identifies the different sputter and ion beam sources as all interchangeable above a rotating shutter. The shutter itself is merely a movable shade to temporarily block the emissions of the source from the specimen. Miyoshi discloses a chamber which is utilized to prepare a reactive material for exposure to the specimen. The chamber is sealed by a movable shutter. The shutter is closed to allow the reactant materials to enter the chamber in a controlled environment. When the reaction has produced the appropriate products, **the shutter is opened and the specimen is exposed to the material. The shutter is therefore utilized to** encapsulate the reactive materials, not shield the specimen or other fixtures in the chamber. Contrary to the Examiners assertions, the shutter of Miyoshi *would not* function to isolate one means from another so that the different processes do not affect the functionalities of the other components. In the most recent office action, the Examiner has stated, on Page 8, “[r]egarding isolating the etching means from[sic] the other means (claim 1), Miyoshi teaches[sic] a shutter which isolates [sic] means from an etching means” (referring to column 9, lines 62-68 and column 10, lines 1-4. This specific reference to Miyoshi teaches that the shutter is utilized to shield the catalyzer holder 2 (the source) from the operation of the cleaning device 5. ***The shutter 4 is utilized to shield the catalyzer (source) from the operation of the cleaner which is utilized to clean the interior of the chamber and specimen stage when the device is not in operational use to perform any etching, cleaning or coating of a specimen.*** Neither Siebert nor Miyoshi teaches or suggests that a shutter may be utilized to shield different reactive components or fixtures during the use of other source components within a closed vacuum chamber during the operation of a source on the specimen. This is not a case where one element has merely been substituted for another. A rote combination of the teachings of Sieber, Moslehi, Mahler and Miyoshi would not result in the claimed invention.

The combination yields more than a predictable result, as required by *United States v. Adams*, 383 U.S. 39, 50-51 (1966), cited with approval by *KSR*. The claimed invention combines the heretofore disparate functionalities of plasma cleaning, etching with plasma and otherwise, and coating are all performed in the same chamber under continuous vacuum. This is especially true of plasma etching, which does not readily combine with other processes. None of these references recognizes the need to isolate the plasma etching function during operational etching of the specimen with particularity, nor do they recognize any need for separation of the functions. To stuff all of the identified features in a box does not yield a useful device. Even placing the Miyoshi reaction chamber into a common vacuum chamber would not yield the claimed device, as the device segregates the plasma etching function *while operational with respect to the substrate*, and not as a preparatory or *maintenance* step.

As stated by the Examiner, some hindsight is necessary in any obviousness evaluation.

However, the MPEP clearly states:

Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the 'differences,' conduct the search and evaluate the 'subject matter as a whole' of the invention. The tendency to resort to 'hindsight' based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

MPEP §2142. Applicant respectfully reasserts that the Examiner is applying impermissible hindsight in the evaluation of the above-cited prior art references. None of the prior art references, either alone or in combination, teaches or suggests a shutter to shield different reactive components or fixtures during the use of other source components during the operation of a source on the specimen. Withdrawal of the rejection is respectfully requested.

CONCLUSION

Based on the foregoing remarks, Applicant respectfully submits that claims 1, 3-7, 16-21, 24-31, 58-65, 68, 69, 73-75, 118, 120, 121, 124-137, 139-151, and 158-164 are in condition for allowance.

Applicants believe there are no fees necessary to file this Response. If this is incorrect, the Office is hereby authorized to charge any additional fees under 37 C.F.R. § 1.17 to the deposit account number 50-0525.

Respectfully submitted,

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